GEORGE W. YORK, Editor.

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Contributed Articles

Value of Bees in Fruit-Orchards.

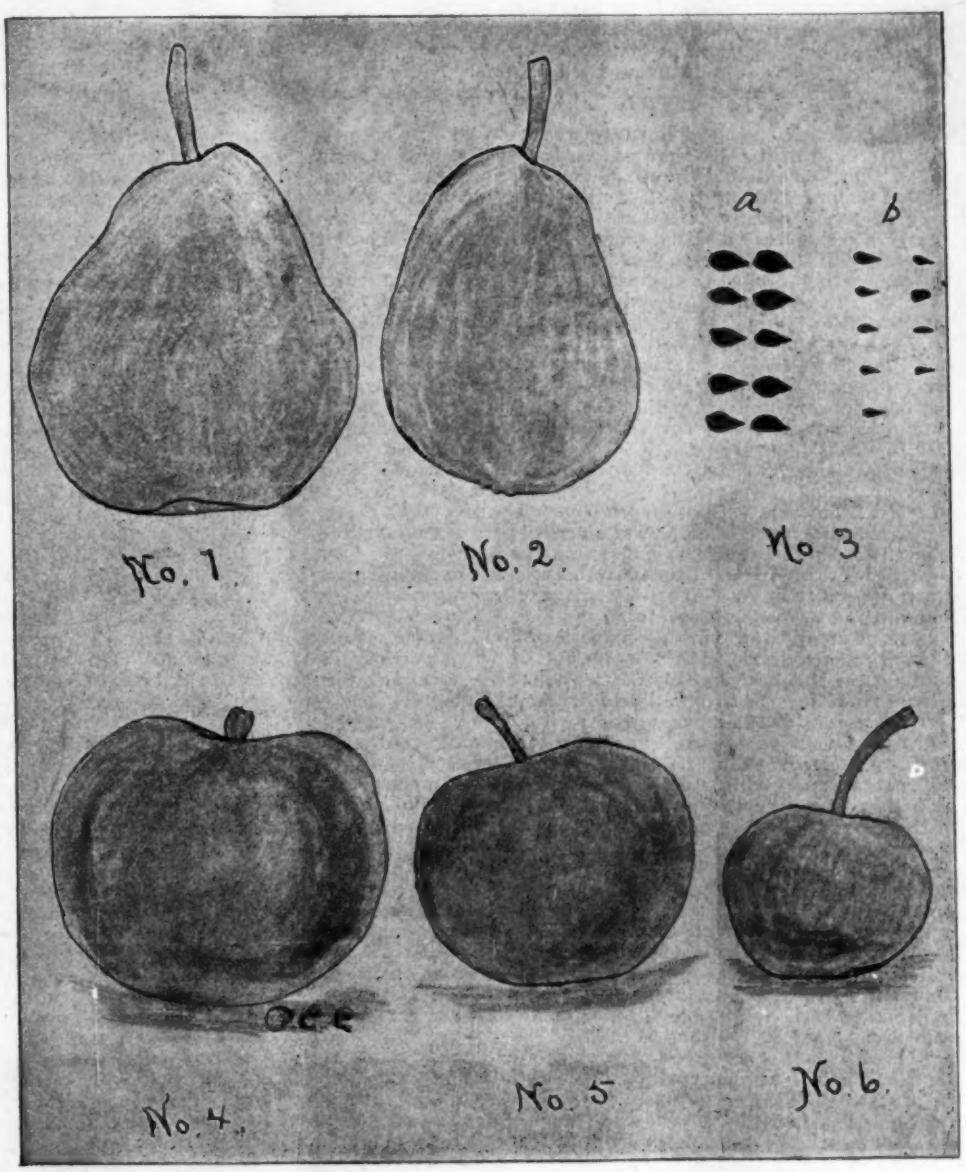
BY J. E. CRANE.

IT is not my object in this paper to thrash over old straw, but rather to gather some golden grains of truth from a harvest of facts that has ripened since the memorable discussion of this subject a few years ago, and gathered into a most interesting symposium.

Perhaps nothing in that symposium was more noticeable than the difference of honest opinion held by many intelligent observers, and for good reasons as the sequel will show. It is an interesting fact that the new light on this subject has come thru the efforts of the fruit-growers rather than the bee-keeper, and that the solution of the problem is a most complete proof of the value of bees to the fruit-grower.

Before giving the new facts that have come to light on this subject, I must tell how it came about.

Many years ago, down in Virginia, a farmer planted out a large pear-orchard. As he was a bright man he thought he would make a very profitable investment, and not plant any unproductive trees. As Bartlett pear-trees are almost universally known as the most productive as well as profitable, he planted his entire orchard of this variety. He cultivated his orchard with great care, fertilizers were applied, and when he lookt for fruit he found "nothing but leaves." But he kept on until his means were exhausted and his place went under a mort-



The Effect of Cross-Fertilization in Enlarging Fruit as well as Seeds.

gage. The new owner thought he had a bonanza in that pear-orchard, and he, too, cared for it until his ability to do so failed, when it past into the hands of another person; but still it failed to yield a crop of fruit. I take it that the last owner had some faith in "book-farming," for he sent to the Department of Agriculture at Washington for a solution of the problem of an unproductive orchard of Bartlett pears. Mr. M. B. Waite, of the Department, was sent down to study the subject on the ground. He guest the trouble to be the lack of cross-pollination with other varieties, and, fortunately, he guest right. More or less of the orchard was grafted with other varieties; but before it came into profitable bearing it was struck with "blight" and ruined. But it had served a useful purpose. A new interest was taken in the subject of the effects of self and cross pollination of fruit-blossoms, and the scientific study of the subject began. This was carried out by taking pear and apple blossoms just before they open, and removing a part of the blossom and then applying either pollen of the same variety or some other variety, and covering at once to prevent insects from interfering. In this way it could be told whether a given variety would prove fertile with its own pollen or not, and just the effects of crossing with other varieties.

As a result of these studies Mr. Waite says: "Many of the common varieties of pears require cross-pollination, being partially or wholly incapable of setting fruit when limited to their own pollen. Some varieties are capable of self-fertilization. Self-pollination takes place, no matter whether foreign pollen is present or not. The failure to fruit with self-pollination is due to sterility of the pollen, and not to mechanical causes, the impotency being due to lack of affinity between the pollen and ovules of the same variety."

"Varieties that are absolutely self-sterile may be perfectly cross-fertile. The normal typical fruits, and in most cases the largest and finest specimens from both the so-called 'self-sterile' and 'self-fertile' varieties, are crosses."

"Self-fecundated pears are deficient in seed, and the seeds produced are usually abortive. The crosses are well supplied with sound seeds."

He gathered most of the cross and self-pollinated fruits resulting from most of his experiments for study and comparison, and found, as a rule, a decidedly better development of the blossom-end of the fruits of those cross-pollinated than those self-pollinated. He found, also, a disposition or tendency in self-pollinated late varieties of pears to wither before ripening, while those resulting from crosses ripened perfectly. My son has offered to copy several of Mr. Waite's illustrations.

Fig. 1 shows a Bartlett pear crost with pollen of Easter pear.

No. 2 shows a self-pollinated Bartlett pear.

No. 3 shows seeds under *a* from cross-pollinated Bartlett pears; under *b*, seeds from self-pollinated pears.

About three-fifths of the varieties of pears experimented upon appear to have been wholly self-sterile, or were greatly benefitted by cross-pollination.

Even with those varieties capable of self-fecundation, the pollen of another variety is prepotent (more powerful); and unless the entrance of foreign pollen is prevented, the greater number of fruits will be effected with it.

As apples blossom soon after pears, a large amount of work was done with them to ascertain the effects of self and cross fertilization. He says:

"In a general way the results were similar to those obtained in the experiments with pears. The division of the varieties into self-sterile and self-fertile sorts was not nearly so well markt.

"Crossing gave decidedly better results in all cases than self-pollination. The Baldwin, which was experimented upon freely, may be cited as a variety that comes as near being self-fertile as any, and yet even this is far from being entirely so; for in the best trees the percentage of fruit resulting from self-pollination was not more than a fourth of that which resulted from crossing. Some of the Baldwin trees, in fact, seemed to be self-sterile, and all the varieties occasionally set self-pollinated fruit."

He does not seem inclined to place much confidence in a strict classification, even of pears, as a variety may be quite self-sterile in one section, as in the North, and yet be quite self-fertile in the South or in some other season.

Among the sorts of pears he found more or less completely self-sterile are the Bartlett, Anjou, Boussock, Clairgeau, Clapp's Favorite, Sheldon, Louisa Bonne de Jersey, and other common varieties. Still less would it be possible to classify apples. A variety may be self-fertile this year and quite the reverse next year, or in one section of country and not in another. The weather at blooming-time is important. He says:

"The weather during the blooming period exerts both a direct and indirect influence on the setting of fruit. Even when not injured by frosts, the blossoms are often chilled by the cold to such an extent as to interfere with fecundation. Moderate cold renders the self-fertile trees self-sterile, and severe cold renders them sterile to cross-pollination as well. Warm and sunny weather at this time indirectly aids the fertilization by favoring insects in their work of cross-pollination."

The results of self-pollination in apples are very interesting. Again I quote from his paper: "The apples resulting from some of the experiments were collected and studied, and the results were found to be parallel with those obtained in the experiments with pears, the crosses being larger, more highly colored, and better supplied with seed. For example, *the hand-crost Baldwin apples were highly colored, well matured, and contained abundant seeds*, while the self-fertilized *were only slightly colored, were but one-fourth to two-thirds the regular size, and seedless.* The crosses were, in other words, like the better specimens of apples not bagged from the same tree, and the self-fertilized fruits corresponded with the undersized, poorly-colored specimens from the same trees." The italics are my own, for I wisht to call attention to the inferior quality of apples produced by self-pollination, rendering them of little value except for cider or swine.

Fig. 4 of my illustrations shows a Baldwin apple crost by pollen of the yellow Bellflower, while No. 5 shows a large specimen of Baldwin self-crost, and No. 6 a small specimen of the same. The effects of cross-fertilization in increasing the size of fruits is an exceedingly interesting fact.

Prof. Munson, of the Maine Experiment Station, has found that the size of tomatoes may be quite dependent upon the amount of pollen they receive while in bloom. One receiving a large amount may be four times as large as one receiving only a small quantity. We have, doubtless, all observed that a pea-pod that has set only one or two peas is greatly dwarft in size. What the pod is to the pea, the skin and pulp are to the apple-seeds. Facts prove, beyond the shadow of a doubt, that the cross-pollination of apples does affect not only the seed but the fruit also.

Prof. Waite gave considerable attention to the quince, but did not find so great a difference, and the fruits were as perfect and as abundant where self-fertilized as when crost. This is not as we should have expected, but we should be satisfied with the truth.

Prof. F. A. Waugh, of the Vermont Agricultural College, has been at work along this same line in a careful study of the numerous varieties of native and Japanese plums, and has found them, almost without exception, self-sterile here in the North.

In concluding his paper Mr. Waite says: "The number of insect visitors in any orchard determines to a great extent the amount of cross-pollination carried on. The pollen of the pear and apple is not produced in sufficient quantity, nor is it of the right consistency, to be carried by the wind; and the pollination of these trees is, therefore, dependent upon the activity of insects.....If there is no apiary in the neighborhood, therefore, each large orchardist should keep a number of colonies of bees. Honey-bees and other members of the bee-family are the best workers in cross-pollination."

His advice to fruit-growers is to plant not more than three or four rows of any one variety together, unless the variety is known to be perfectly self-fertile, and be sure there are enough bees in the neighborhood, or within two or three miles, to visit properly the blossoms, and, when possible, to favor the bees by planting in a sheltered situation, or by planting windbreaks.

I must confess a keen enjoyment in again taking up the study of this subject under the light that recent scientific investigation by careful, painstaking, and unprejudiced observers has thrown upon it. We can now see why there was such a variety of opinion on this subject in the symposium referred to. We find that, while some varieties of both apples and pears are, under favorable conditions, capable of self-fertilization, yet a majority of the various varieties of apples and pears are either wholly dependent upon insect visits, or greatly benefited by them, in setting and maturing their fruits.

Should any wish to study this subject further, I would refer them to a paper by M. B. Waite, Assistant Pathologist, Division of Vegetable Physiology and Pathology, in the Yearbook of the Department of Agriculture for 1898, which I wish might be placed in the hands of every fruit-

grower of the land. Prof. L. R. Jones, of the Vermont Agricultural College, informs me that Mr. Waite is quite conservative, and does not overestimate the value of bees in this connection.—Gleanings in Bee-Culture.

Addison Co., Vt.

Something About Honey-Extractors and Their Use.

BY C. P. DADANT.

AS I intend to buy an extractor this year, I should like to get some information in relation to it from a user's standpoint, and not from the manufacturer.

Would a machine for a 12-inch depth frame take (if a two-frame extractor) four of the six-inch extracting-frames? I may wish, at times, to extract from the brood-frames, which are standard length, and 11⅜ inches deep.—J. P. COBURN.

ANSWER.—Any extractor made for large frames, with a basket 13 to 13¾ by 20, will take one of the large frames in question, or two of the shallow extracting-frames. So a two-frame extractor will take four shallow frames with side-bar 6 inches deep, such as we use.

We have always used a four-frame extractor, and those that were made for us years ago were of the Excelsior pattern, then manufactured by Mr. Newman, in Chicago. These extractors took four large Quinby frames, or eight small ones, and are still in use by us. We have five of them, and altho some of them have been very much battered by rough usage and transporting in wagons with honey-barrels from one apiary to another, they are still fit to be used, tho some of them have been repaired a number of times.

They were made without any center rod, so the frames can be turned over without lifting them out, and we find that such extractors are about as convenient as the reversible, which are necessarily much more cumbersome since the frame baskets in them have to swing around in the can. The task of turning the frames over when they do not have to be lifted out, makes but little additional work, and one is able to put twice as many frames in the same space. The four-frame reversible extractors are quite expensive and cumbersome.

Economy in extractors is a mistaken saving. A farmer might as well economize in buying a plow, or a carpenter in buying a saw, or a gardener in buying a spade. The original cost of these implements is nothing compared to the amount of work they do, and an apiarist with but two colonies of bees can easily pay for his extractor in one or two years by using it judiciously.

So, in buying extractors, I would urge always to buy the very best regardless of cost. If a lubricant is needed when using it, use honey only, but be sure and wash it off in hot water as soon as the work is over. Tin will remain bright under a coat of honey, but wherever the tin is worn the iron under it will color the honey and will rust if allowed to stand any length of time. So we always wash our extractors with hot water as soon as the crop has been taken off, and dry them thoroly at once.

The extractors that are now made are of much better quality than those made previously, strength being now more considered. The apiarist may save much strain to his machine by using combs of fairly even weight in the opposite baskets of the machine. This is the principal requirement, as the overbalancing caused by a greater weight on one side will be likely to warp the baskets or the frame.

There is no need of fast turning, especially in warm weather. Ascertain the speed necessary to throw out the nectar, and regulate the motion in accordance with this. A great speed only serves to break out the comb, or to crush it against the screen. Hancock Co., Ill.

Cellar-Wintering of Bees—Something About It.

BY G. M. DOOLITTLE.

A CORRESPONDENT writes that he is wintering his bees in the cellar for the first time this winter, and that upon going into the cellar lately he found one of the colonies roaring to quite an extent. He wishes to know what caused the roaring, and also wishes me to tell thru the columns of the American Bee Journal how a person can know when bees are wintering well in a cellar.

Answering the above as best I may, I will say that it is not an uncommon thing to find a single colony somewhat noisy upon going into the cellar, but when one is so found it is well to mark it in some way, that it may be watcht or lookt after the next time you go in. Very probably the next time the cellar is visited he will find this colony as quiet as any, for without more light on the subject, I should expect that this colony was in the act of taking honey into the cluster.

Where bees are wintered out-of-doors they generally "break cluster" with every warm spell that comes, and go over to the outside combs of sealed honey, uncap the same, and carry quite a store of it over into the center combs surrounding the cluster, so that they may have plenty of unsealed honey near at hand to carry them over to another warm spell. This, in a measure, insures their safety from starvation should the cold hold out longer than the sealed stores immediately above them last, as they have this much in addition. In thus carrying honey the whole colony is aroused, and a merry hum is given off, the same as with colonies when being fed at any time, or when procuring nectar from the field, for, so far as I have observed, bees never move nectar from flowers, or feed on honey from feeders or the combs, but that this hum of happiness is heard.

Now and then a colony will carry honey into the cluster as above while in the cellar, doing this as often as the unsealed honey is consumed surrounding them, which would account for the roaring spoken of by the correspondent; but the majority of colonies wintered in the cellar do not usually thus carry honey. If this particular colony keeps up this roaring I should try (if it were possible to do it without disturbing other colonies) giving such colony more or less ventilation to its own hive, until I struck the right amount, when it would remain as quiet as the others.

As to the part about bees wintering well, it would be a hard matter to tell exactly about it; but that I may do the best I can, I have just been into my cellar and will tell the reader as near as I can what I did and how I found things, and I think the bees are wintering fairly well this winter.

My bee-cellar is *perfectly* dark, in fact, so dark that I have many times taken a piece of perfectly white paper in with me, a foot or more square, and after having staid so long that my eyes have become accustomed to the darkness, all they would were I to remain there 24 hours, I have taken this piece of paper and past it backward and forward before my eyes without being able to discern the least sign or shadow of it.

There are four doors leading to the cellar, all of which are shut behind me in entering one after the other, so that no disturbing ray of light or breath of cold air shall disturb the bees from their quiet slumbers, special pains being always taken that all of my movements shall be of the most quiet kind, so that no jar or loud noise shall ever greet them. Being in total darkness I stand still and listen, for in this listening we can tell more about how the bees are wintering than by any other one thing after we have struck a light. The sound I hear is like a low, faint murmur of a slight breeze in some far off tree-tops, the rumble of some train of cars miles away, or the lashing of the waves on some distant shore, which is very nearly indescribable. Occasionally this semi-stillness is broken by a bee flying out on the cellar-bottom, or some single bee giving off a "zeep, zeep," as we often hear while holding the ear close to a hive in midsummer, but the same being very much fainter and more suppressed.

I have about 75 colonies in this cellar, and the above describes as well as I can all that could be heard for a time sufficient to count slowly 500, I standing perfectly still all of this time before striking any light. Should there be any mice or rats present in the cellar, their presence is more quickly detected in this way than with a light, for they are very apt to make a noise by running about among the hives, which is easily heard in the deep darkness and stillness which reigns.

If the correspondent has only a few colonies of bees in the cellar, he may be obliged to place his ear near the hives to hear their low hum, and stay half an hour or so to hear a bee fly out; while if there are 200 to 300 colonies in the cellar the hum will be louder, and bees be flying nearly all the while, if near spring, which it will be before this is publisht.

If the bees are in the house-cellar it will be necessary to get up before the family in the morning, so that all may be still, in order to test this part of the matter.

After listening till satisfied, I strike a match and light a paraffin or spermaceti candle, thus not annoying the bees to nearly so great an extent as a lamp or lantern, while with it I can secure a much more satisfactory result. These candles can be procured at almost any country store, and I always advise their use in bee-cellars.

Having the light I carefully proceed along the rows of hives, looking closely for any traces of mice, for so far I have not succeeded in fully keeping mice from any bee-cellar. The presence of mice is detected by finding heads and abdomens of bees with the thorax gone, the same having been eaten, and by fragments of comb under the hives. If these are found buy a common choker trap, if you do not have any, and for bait use squash or pumpkin seeds, as these have an attraction for the mice beyond anything else ever used in or on a trap.

Having the mouse question settled, I next look at the bees at the bottom of the combs. Where wintering well only rows of abdomens appear, the points all standing outward, and nearly or quite motionless, unless you have been awkward in your movements so as to arouse them needlessly. Be careful not to hold the light too near, or breathe on the bees, as they are easily aroused by either of these. I sometimes raise the covers to a few hives and look in at the top of the frames, but as this can rarely be done without disturbing the bees, it is better not to do it unless some positive need requires it.

As I am about taking my departure I look at the temperature, which to-day (Feb. 28) was 46 degrees, which is as near right as any unless such should be 45 degrees. But should it go down to 42 degrees, or rise to 50 degrees, the bees would show but little difference, except that the murmur heard would be somewhat louder.

At the near approach of the time for putting bees out, the hum will become louder, they will not remain so quiet under the light from the candle, and more will go to the cellar-bottom, even when wintering in good shape.

Onondaga Co., N. Y.

Color Cards for Grading Honey, Etc.

BY WM. MUTH-RASMUSSEN.

MR. E. E. HASTY (page 38) does not seem to "catch on" to the object of color cards for classifying honey. Comb honey is clast as white, light amber, amber and dark. By these designations it is quoted in the various markets. The classification applies only to the color of the honey, and has nothing to do with the whiteness, greasiness, evenness, fullness, or any other external feature of he comb.

When I am grading and packing my honey, it is of importance to me that my grade marks shall be correct and acceptable in any market where the honey may go. If part of my honey is called light amber in one market, and amber in another; and another part of it is called amber and dark in different markets, I never know how I stand, or what I may expect to get for my honey crop. Hence, the necessity of having a definite standard to go by.

If we could always be sure of the source of the honey, we might designate it as White Clover, Basswood, Alfalfa, Sage, Buckwheat, etc.; but this is not always practicable, particularly with the colored honeys. The classification should be uniform for the whole country, so that a case markt "Amber" by me will be accepted and paid for as amber, whether it is sold in San Francisco, Chicago, or New York, and not knockt down as "Dark" after it leaves my hands and control. If customers prefer dark honey in a white comb, the correct grading and classification is just what will enable them to get what they want with the least trouble.

WHAT MAKES A LAYING WORKER?

To this question (page 39) Dr. Miller gives his usual answer. Allow me to advance a theory in this regard. The nurse-bees are governed in their activity partly by the temperature and partly by the amount of nectar and pollen brought in by the field-workers. It has been said that the queen is furnisht with a special, prepared food, which stimulates her reproductive organs and causes her to lay. According as this food is furnisht in greater or lesser quantities, the egg-laying is increast or diminisht. When this queen-food is entirely withheld, the egg-laying ceases for the time being.

I believe that all worker-bees are capable of laying at some time of their existence, if not thru the whole of their adult life. Under normal conditions the queen-food is never offered to worker-bees, but when a colony is queenless and anxious for brood, may not the nurse-bees select such workers as in their judgment are most capable of egg-laying and furnish them with queen-food? and may not this queen-food have the same stimulative effect on the dormant and defective organs of these workers as it has on the queen? "I don't know," but I think so.

REMINISCENCES—HONEY-EXTRACTORS.

In Gleanings in Bee-Culture is a description of the Peabody honey-extractor—the first extractor made and sold in this country—together with illustrations of the machine and its inventor. How this brings up memories of olden times, when Wagner, Langstroth, Quinby, Grimm, Novice, Baldridge, Heddon, Argo, and many others, more or less unknown to the present generation, used to write for the American Bee Journal.

In the spring of 1871 I bought my first extractor of Mr. Peabody, and, when sending it, he wrote: "I have just received an order for another extractor from California." As far as I am aware, I was the first bee-keeper on the Pacific Coast to own and operate a honey-extractor. If any one preceded me, let him arise and claim the priority.

Previous to that time all liquid honey was here produced by the sun-extractor, or, as we called it, the "sun-strainer." The first sun-strainer I workt with had a capacity of a ton on a hot day. That was in Southern California.

Inyo Co., Calif.

NO. 3.—COMB HONEY PRODUCTION.

Spreading Brood—Encouraging Breeding—Strengthening Weak Colonies.

BY R. C. AIKIN.

THE preceding article closed with my method of spreading brood by putting the combs back end foremost, *i.e.*, putting the end of the comb having brood in it to the back of the hive, and the honey end to the front. The same thing may be practiced by simply turning the entire brood-chamber half around, but of course this can only be done with hives having loose bottoms and the entrance in the bottom-board.

To thus change the position of the brood is a splendid way to get the combs full of brood from end to end. It is the nature of the bees to cluster near the entrance, *generally* right at the entrance, and this results in the brood-nest being close to the front of the hive. This rule will be more nearly universal in sunny climes, and where the hives face the sun. To face them north would cause very many colonies to start breeding at the back, but simply because there they find the most heat and the driest part of the hive. Also to face east or west will cause many to start at the side, but in this case the brood will usually be nearest the entrance end.

After the starting of the brood-nest at the very beginning, the way it is spread thereafter depends upon the location of the entrance, in the early spring spreading both toward the entrance and toward the warm side; but once the colony becomes fairly strong, then mainly toward the entrance. If the first breeding of the season has been about the center of the front end, they will spread crosswise of the combs, and have brood in almost, if not quite, every comb, while there is a lot of the back ends free of brood.

Following these ideas I reverse the order when a colony has fairly started, so as to have the equivalent of 1½ to 3 combs of brood, even with less than that if the weather is warm and the bees seem able to guard the entrance so far from the breeding cluster. This plan gets the combs filled with brood from end to end, and while we get no less brood—probably more—it is in *fewer combs*. It surely encourages breeding, for the bees will stretch the cluster to the front to guard the exit, thus taking all that can be spared from the brood, and the queen, finding bees all over the combs, and the honey being cleared from the part of the comb near to the front, occupies with eggs. It is nice when I want to contract a brood-nest by putting in a dummy, to find 6 or 8 combs of brood *in 6 or 8* and not in 10 combs.

I also make use of the same idea to stimulate breeding—I reverse combs having the back ends full of honey and the fronts empty, when the bees uncap and move the honey back. If a colony is made to handle honey, and have much in their sacs, they feed the queen and brood well, and we gain much the same effect on breeding as if they gathered from the fields.

The effect of these manipulations will be by far more noticeable if there be no gathering from the fields. If nectar is being brought in of course we lose the effect of the

bees handling their old stores, but shifting the brood has its effect under either condition, and is well worth the trouble to accomplish it. I got this idea several years ago, and have largely practiced it ever since. If a colony had the fronts of all their combs filled with brood, and the backs of all, or nearly all, empty, when the honey-flow starts the first stored goes right to those back ends; but just turn the hive at that time and get the brood to the back, and they will store in sections rather than put honey so close to the entrance, and between it and the brood.

To have empty comb next the entrance, and the brood back of it helps quite materially to lessen swarming. I know from experience that *dry* comb placed below and forward of the brood *just at the beginning* of the flow, will very largely control swarming when running for extracted honey. I have practiced it. Of course, this is not practical in producing comb honey, but in a comb-honey colony, if there must be empty comb in the brood-chamber when the honey-flow starts, have it as much as possible between the brood and the entrance. Thus arranged, much of the honey that would have been put in this comb had it been back, will be put above in sections.

Referring again to those colonies that failed to get a good start in early spring, and so are not able to get to proper strength when the flow begins, it is well to help such just as soon as others are strong enough to spare help for them. Remember that the weak colony is not in need of brood, it is *bees* they want. Give them bees and the queen will very soon get the brood. The queen has simply been held back because she had not workers enough to care for the brood, and when she has the bees, is ready to supply the eggs. I suspect that many a good queen has been condemned (blindly) because she did not have a good, strong colony when she was not at fault at all.

I say give the weak colony *bees*. My method of giving the bees varies according to circumstances. Usually I find and give a comb, from some strong colony, that has a goodly patch of brood from which the bees are *just emerging*. There should be bees enough emerge in a short time after the comb is given to care for the rest of the brood in that very comb and keep it from chilling, for the trouble with the colony is that it has not bees enough to care for what the queen can already supply. In two or three days the larger part of this ripe brood is hatcht, and the queen is supplying the vacated cells with eggs.

Another way is to bring bees from an out-yard, if such you have, bringing them in a wire cage and hiving them in just at dark or nearly so. They should be sprinkled with sweetened water, or in some way made to fill their sacs so that *all* go in *loaded*. If the weather is cool, hive them in both full of honey and so nearly chilled that they are glad to get in out of the cold, thus the danger of having the queen killed is reduced to the minimum. In putting strange bees into a colony always have both those added and those in the hive being added to, full of honey. Also try as much as possible to add young bees; old ones will be far more likely to kill the queen.

In localities where there is little or no honey brought in before the main harvest begins, it is a good plan to try to have each colony almost out of stores just the last few days—say a week to 10 days—before the flow begins. This keeps down the disposition to get the swarming-fever, and it is a great gain to have all come right up to the flow without thought of swarming.

If, however, there is a light flow for some days or weeks just prior to the main flow, then it is almost out of the question to have that "semi-starvation" condition, and so much harder to keep the swarming under control. The next best thing to the short-stores plan is to have adjustable brood-chambers so that they can have plenty of comb and ventilation, the surplus comb to be removed at once when honey is coming in freely. The difficulty with the extra-comb supply is to keep the queen from spreading her brood too much; not getting too much of it, but getting it *scattered* into too many combs. Larimer Co., Colo.

The Wild Aster in North Carolina.

BY W. H. PRIDGEN.

IN reading Mr. Schmidt's excellent description of wild aster, on page 785 (1899), I was struck with what I suppose is another peculiarity. Judging from the date of blooming in Ohio compared with that of this place, it begins North as soon as the right atmospheric conditions prevail, and keeps pace with those conditions southward, altho the young shoots for next year's growth are now forming around the old stems at the ground, and the further South the longer the season for development.

Here it begins to bloom in September and lasts until late in November, varying with the seasons. Last year our bees commenced storing rapidly Oct. 5, and continued a month before there was any evidence of a hold up, except from an occasional rainy day, the peculiar odor referred to being very pronounced.

When the flow from it is light, the honey sometimes has a strong or bitter flavor; at other times it is good, and especially if extracted and allowed to candy, which it does quickly.

It flourishes best on moderately dry alluvial soils, or good uplands that are cultivated every third year. The first year after the land is cultivated, it is thinly set, but the bunches present seem to attain their full growth, while the second year nearly everything else is crowded out, and while in bloom it presents a field of whiteness.

Where the conditions are the same, some plants bloom much earlier than others, and the time of blooming is hastened or delayed by the different conditions or kinds of soils, and the surroundings also, which supplies a prolonged, continuous flow from this source.

The cultivation of only a small plot of land two years in succession, altho it may be surrounded by or in a lot, treated as above described, throws matters out of joint, and the spot can be detected for several years, even if so treated only once, and afterwards remains unbroken for two years. This is true, altho one year's cultivation apparently destroys it root and branch.

It furnishes excellent early grazing for cattle or sheep, and is seldom seen on pasture lands. On roadsides and in fence-corners, waste-places, etc., where the land is neither broken nor continuous grazing allowed, it thrives for years, possibly from the same roots, but finally yields to the laws of nature, and gives place to something else.

Years ago I regretted to see frost during the time of its bloom, but I have learned that light frosts do not injure it in the least, and that heavy dews and cool nights are conducive to the best yields, while hot, dry or windy weather has the reverse effect.

Like other plants, it sometimes fails to yield nectar at all, but can usually be counted on for at least a little help. I think many of my colonies stored at least 50 pounds each from it the past season. Warren Co. N. C.

CONVENTION PROCEEDINGS

Report of the Colorado State Convention.

[Continued from page 150.]

Prof. Gillette then exhibited some sections. One contained a starter of foundation colored by lampblack, removed from the bees when they were just beginning to draw it out. It showed pellets of wax added by the bees. Another sample, containing lampblack foundation extending half-way down, showed that the bees transferred wax from the upper to the lower portion. Another sample containing a full sheet of black foundation showed that the bees had transferred wax from it to the corners of the wood. Samples of wax molded in test-tubes were also shown, showing the amount of wax in pound sections of honey under different conditons. (The exact weights were not obtained for these notes.)

SPRING MANAGEMENT OF BEES FOR COMB HONEY.

Mr. Lyon—Wintering comes first. I can carry them thru the spring better than thru the winter. They get weak in the spring. Shall we double weak colonies or not? I have done it only in one way, by taking one hive to another, and uniting. With me, it has been a terrible failure. In two or three weeks they don't seem to be stronger than before. There are other questions. Shall we change brood from the strong to the weak? Should we spread brood in Colorado, or turn the combs end for end? Should the hive-entrance be left open in winter as in summer?

Mr. Pease—I have sometimes tried spreading brood, and thought it beneficial, but can not say certainly.

H. Rauchfuss—I used to spread brood to double up, and to draw from the strong to give to the weak, but do so no more. It gets the brood-nest out of the proper shape. The *bees* make the colony, not the queen. You can give the queen of a weak colony three pounds of bees, and you will be surprised at the amount of brood you will get.

Mr. Martin—Instead of reversing one frame at a time, have you tried reversing the whole hive end for end?

H. Rauchfuss—I have thought of it, but never tried it.

Mr. Martin—I tried reversing in this way, as the bees consume the honey in the front end first. I think it was a success. It causes them to consume more honey and to convert the honey into brood.

Mr. Moon—I generally leave them alone. They increase faster than they can cover the brood. I give them plenty to eat, and consider that the most I can do to stimulate them. They work more after being fed; they seem to "rustle" for pollen better. The cold nights here make it unadvisable to spread brood.

J. B. Adams—I don't spread brood. I would reverse the whole hive, or all the frames. If part is reverst, the bees can't follow toward the front fast enough to cover it.

F. Rauchfuss—When do you feed, Mr. Moon?

Mr. Moon—I have an excellent location for early spring, but there is nothing between the early sources and alfalfa. I feed in that interval. That is right after fruit-bloom, about the middle of May to the 20th. I feed bran early so as to prevent the bees from becoming attacht to places where they will bother the neighbors.

J. B. Adams—Does it pay to feed a colony already well stockt?

Mr. Moon—Yes, I believe it pays to feed all I can get for stimulation.

Mr. Lyon—I believe in feeding. I wouldn't run a yard without feeding. Some try too early and make a failure. Unless these things are done at the right time, they should be let alone. Above all, use plenty of salt and carbolic acid. I never open a hive without an atomizer. My plan may not be a success with you, and yours not a perfect success with me. You are all against spreading brood. I take the other stand. If you spread brood with a handful of bees, you do more harm than good. I go to a strong colony, take a frame of brood with as many bees as possible, and make the weak colony strong, and after a certain time take another. It does not do harm if done judiciously at the right time. If the weather is cold, I avoid it; if right, then I commence spreading.

Mr. Harris—I took a comb from a strong to a weak colony last spring; and think otherwise I would have lost it. It made a booming colony. I think it well to equalize.

Mr. Lyon—Don't some of you try this and blame me. Be sure the strong colony is in the right condition. These things are very misleading when not given in a prepared essay.

H. Rauchfuss—I want the bees. I don't want the brood so much. The bees go back to the old stand. I think just changing the positions of the weak and the strong colony will accomplish this without spreading.

Mr. Martin—I think Mr. Lyon refers to brood very nearly ready to hatch, with very little unsealed, and in that case I know the plan is very successful.

Mr. Brock—I think the bees know more about the brood-nest than I do. When the weather is warm I assist the weak colonies with combs and brood.

Mr. Pease—Our hives are *not* in the natural shape.

Mr. Rhodes—I began early one season to feed the bees. I had no honey, but fed sugar. The result was I had them very strong at the flow. From seven or eight colonies I had a surplus of 1,000 pounds, while my neighbor with 100 colonies didn't have enough to spread over a buckwheat cake. I think it better to feed 21 days or a month before the flow, as the flow comes June 15.

DRUG TREATMENT OF FOUL BROOD.

J. B. Adams—Mr. Tracy did not have a case of foul brood when a foul-broody apiary within a quarter of a mile was robbed out entirely. He said he read in Gleanings in Bee-Culture about carbolic acid and salt. He would fill the cells along the top-bars by means of an oil-can, and headed off many a case of foul brood. Don't attempt to *cure* with this. I want to emphasize this. The proportion is one part of carbolic acid to 300 parts of water, with a heaping tablespoonful of salt to every pint of the mixture. Shake well before using. It is best to buy a 5-pound can of the acid.

Mr. Brock—I have used the mixture a number of years. I add 1½ teaspoonfuls of the acid to a gallon of water, with a handful of salt, and apply with a whisk-broom.

Mr. Martin—Was this treatment used the year the bees died off so?

H. Rauchfuss—Yes. I have tried it a good many different ways the last four years, tho not for foul brood.

F. Rauchfuss—The instance Mr. Adams quotes can also be paralleled when nothing of the kind was done. I kept bees a number of years near foul brood, but my bees did not get it.

Mr. Root—I tried carbolic acid in the proportion of 1 to 500 in pure cultures, without killing the germs. I tried a 1 to 300 solution, but that did not kill them. A 1 to 200 solution did. I sprayed all the hives without doing much good. Cheshire recommends feeding carbolic acid in syrup. Mr. Cowan recommends the same, in the proportion of 1 to 300. He thinks napthol beta a better disinfectant. I have not tried it.

FENCE SEPARATORS AND TALL SECTIONS.

H. Ranchfuss exhibited a Danzenbaker super, with fences, in the condition in which it was after the sections of honey were removed, showing a number of brace-comb attachments to the fences. This super was the second one put on a hive. The first one that came off was filled with ordinary sections and separators, and had no brace-combs attacht to the separators. The brace-combs in the Danzenbaker super were not due to crowding. The outside sections were not finisht when it was removed, and another empty super was on top of it while it was being finisht, so the bees had plenty of room. I used 10 of the latest Danzenbaker supers last season, and aimed to put them on the best colonies I had. All had more or less attachment to the fences. The spaces between the slats would be filled up in spots and then attacht to the combs. Many of the combs themselves were built out on the cleats, beyond the edges of the sections. It is claimed that this system results in better filling of the sections. I produced 350 cases altogether, and could see no difference in filling between the plain and the ordinary kind.

Mr. Harris—I tried the fences in five or six 10-frame supers, and did not find a brace-comb on them, tho I did on others.

Pres. Aikin—I didn't get to use any this season.

Mr. Porter—I have been too busy to make experiments.

Mr. Harris—The spaces between the slats were not wide enough at first.

F. Rauchfuss—I have had no actual experience myself,

but expected to get reports in handling supplies. Owing to the shortness of the regular stock, some 4¼x4¼x1½ sections were used by a few. Mrs. Booth likes them, but doesn't think of adopting them. Carl Moon thinks the same. The others have not exprest themselves. The main objection is they are too expensive. Even admitted that they would be cheaper, honey is sold by weight, and we have to take a correspondingly greater number of sections to make it out. There is more comb surface, therefore more foundation required. Perhaps honey would really cost a trifle more to produce in plain sections. One reason why they were not tried more here is that many have supplies left over from the previous season.

Mr. Root—It is hardly fair to compare the tall plain sections with the 4¼x1⅞. Under like conditions, if the separators are exactly the same as those used with the 4¼x1⅞ sections, that is, if plain sections are used with cleated plain separators, they will not be filled any better, because it makes no difference whether room is taken by a cleat on the separator or by the same amount of wood in the section. If 4¼ full bee-way sections, with the corners cut down, are used for comparison instead of the scallopt sections, then the conditions are exactly the same. Some think more honey is produced without separators. I don't know. But the fences are the next thing to having no separators. As to the attachment of the combs to the fences, we have had only one other such report. Attachment to plain separators also happens, but is thought rare. If any bees are inclined to attach to plain separators, those same bees might be inclined to attach to the fences. I have seen thousands of pounds of honey in plain sections in New York, and saw no burr-combs attacht. But the 4x5 sections can hardly be compared with the 4¼ square section. A plain section equally as well filled as an old-style section will appear to be better filled. I recently secured the statement of four leading commission-houses in regard to plain sections. They all preferred the plain sections because they appeared fuller.

F. Rauchfuss—In Mesa County 700 of these plain-section supers were sold last year.

J. B. Adams—I tried one super of the 4x5 sections. They were not fastened to the fences.

Mr. Root—A good many have the impression that the comb is even with the wood in plain sections, but it is not so. The wood does project a little. A super with fences on a weak colony is not filled so soon as one with tight separators. Where the colonies are strong we have had a good many reports that the sections are entered sooner. Other reports have been just the reverse. In regard to the fastening of the combs to the cleats, the comb is more apt to be fastened to a narrow cleat.

Pres. Aikin—My opinion was once askt about the thickness of the cleats. I said 2/12 of an inch was too thick. This is the confirmation. Bees sometimes work out to the cleats, and then round the comb out. For years I have been dissatisfied with the scallopt section. I have used sections with bee-ways clear across. The combs were always nicely finisht. I would prefer the plain section scallopt out a little. I do feel favorably toward the fences. I was experimenting with fences before Mr. Root took hold of them. When he took hold then I quit. I thought I would let others do the experimenting.

Mr. Root—The New York bee-keepers claim that the corners of a comb are better filled out in a notcht section. In a scallopt section the combs are rounding at the corners.

Mr. Martin—Would it justify the extra amount of labor to use the fences?

Mr. Root—I have seen fences that had been in use nine years at Mr. Morton's. All they need is a little scraping across the cleats and along the slats.

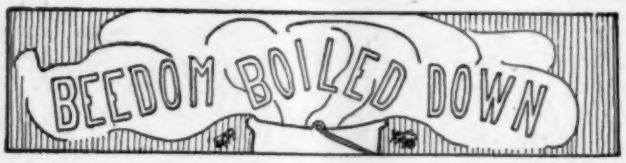
F. Rauchfuss—Mr. Root, have you any reports of the Hyde-Scholl separator?

Mr. Root—We have had one report. If made of wood it is not durable. Even if it is of tin it is a flimsy affair.

[Continued next week.]

Please send us Names of Bee-Keepers who do not now get the American Bee Journal, and we will send them sample copies. Then you can very likely afterward get their subscriptions, for which work we offer valuable premiums in nearly every number of this journal. You can aid much by sending in the names and addresses when writing us on other matters.

The Premiums offered on page 173 are well worth working for. Look at them.



The Amount of comb occupied with brood just before the flow commences is the right number of frames to have in the brood-chamber during the flow.—DOOLITTLE, in Gleanings in Bee-Culture.

Get Colonies Strong for the Main Harvest is the rule with L. Stachelhausen. His experience, as well as that of many others, is that while a colony of 20,000 bees may store no surplus, one of 30,000 may store 20 pounds, and one of 60,000 may store not only 40 pounds, but 120 or more. But he wants as few bees as possible at a time when bees are consumers only.—Bee-Keepers' Review.

Introduction of Queens.—M. Giraud-Pabou reports in L'Apiculteur that he introduces queens by rolling the queen in honey, then placing her between two combs well covered with bees. The colony must be queenless from one to nine days. Of 80 laying queens thus introduced, only three were refused. Virgins are introduced in the same way, only the colony must be queenless at least two days. Of 68 virgins thus introduced, 55 were accepted. This method of introduction was much in vogue years ago, but was not always considered successful.

Cold With and Without Wind.—In Gleanings in Bee-Culture the point is emphasized that 10 degrees above zero may be worse than 20 degrees below without wind. Dr. Miller thinks Marengo, with its all-day-long prairie winds, is a worse place for wintering than many places away North. Editor Root says:

"If this is true, it behooves us to put up windbreaks in the shape of high board fences or evergreen trees. It will be remembered that the winter losses out-doors at Medina have been very low—scarcely ever exceeding 5 percent, and usually about 2 percent. Our apiary is shielded on the north and west sides by a solid phalanx of evergreen trees from 20 to 30 feet high; and on the east and south by brick buildings and lumber-piles. The result is, that on the days of our highest winds there is comparative quiet in the apiary. True it is, there is a great roar of the wind from without, but there are only slight air currents within. A windbreak of evergreens does not cost much, and is perpetual after it is once put down. One consisting of a barn and out-buildings, with an occasional stretch of a board fence on the north and west sides, would be equally effective; and I am satisfied that the slight expense of maintaining the fence or trees would be made up in a few years' time, ten times over, in the saving of many colonies of bees, and preventing others from getting so weak that they are practically useless for honey-production."

Cameras for Taking Half-Tone Pictures.—At first blush, that hardly seems to be a subject germane to bee-keeping, but really it has come to be decidedly so. Pictures add no little to the pleasure of reading bee-papers, and sometimes a glance at an illustration gives one a better idea of some implement than a whole column of reading-matter. A late number of the Bee-Keepers' Review gave rather a discouraging view to those who had kodaks, which are so common, saying their pictures are passably sharp, but that is all, and to get really fine work one must have an adjustable focus. The following from Editor Root, of Gleanings in Bee-Culture, is reassuring to the kodak fiend:

"Bro. Hutchinson seems to have gotten a wrong impression of a kodak. Only a few of the cameras bearing that name are of the fixt focus type; but their pictures are very sharp—much better than 'passably sharp.' But those of the adjustable-focus type of the *same grade*, and with the same stop, give no better results. There are high-grade kodaks of both kinds, and either gives the same sharpness of detail. Why, the smallest pocket size of fixt focus with a picture 1½x2 will make a picture so sharp that it can be enlarged to 10x12 inches. The sharpness of detail is dependent, not upon the fixt or adjustable focus, but upon the *price paid*. All instruments bearing the name 'Kodak' are of the highest grade."

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EDITORIAL COMMENTS

NOTE—The American Bee Journal adopts the Orthography of the following Rule, recommended by the joint action of the American Philological Association and the Philological Society of England: —Change "d" or "ed" final to "t" when so pronounced, except when the "e" affects a preceding sound. Also some other changes are used.

Improvement in Bees is discust in the Bee-Keepers' Review by L. A. Aspinwall, in a way that shows familiarity with the subject. For six years he has been laboring for improvement, and hardly realized what improvement he had made until an absconding swarm of Italians came to him and gave him a chance for comparison. He supersedes the queens of all vindictive colonies; of those that build much brace-comb; also queens that are unprolific. Selections are made from the best honey-gathering colonies; and size, not only of workers, but also of drones and queens is by no means neglected. In working for size, the drones, rather than the workers, are considered; and from one queen which produces extra-large drones he has taken daughters to re-queen nearly a fourth of his apiary. This gives a better chance for the fertilization of young queens.

Sweet Clover for Forage and Honey.—Prof. Thos. Shaw, one of the leading writers and experts on agricultural topics, both in Canada and the United States, has recently written a new book on "Forage Crops Other than Grass," in which he has this to say about sweet clover:

Sweet clover (*Melilotus alba*) is so named, doubtless, from the fragrance of the odor which characterizes it. It is also frequently called Bokhara clover. The two species, *Melilotus alba* and yellow sweet clover (*Melilotus officinalis*) are closely allied, but the blossom of the former is light-colored, while that of the latter is yellow.

Sweet clover is a strong, vigorous-growing biennial. It is brancht and upright in its habit of growth. It is one of the most hardy plants of the clover family. When once firmly rooted it has great power to withstand drouth and heat, and it can also endure low temperature. Being a ravenous feeder it is able to maintain itself in soils too poor to sustain other species of the clover family. The writer has succeeded in growing sweet clover on a vacant lot in St. Paul, from which several feet of the surface soil has been removed, insomuch that only sand and gravel remained. Moverover, it is a legume, and one which has much power to renovate soils. A plant, therefore, which is possest of such powers should not be lookt upon as worthless. That it is so is the popular idea. It has even been lookt upon as a weed, and some countries and States have included sweet clover in the list of proscribed noxious weeds.

But sweet clover has been grown to some extent to provide hay for live stock in the cured form, and also to provide pasture. And it has been grown to furnish food for bees when it is in bloom. It has been grown for all these uses in the South, more particularly in the States of the lower Mississippi basin. For providing hay it is not very suitable, for the reasons, first, that it is woody and coarse in character; second, that it is difficult to cure; and, third, that it is not much relisht by live stock. They do not care to eat it when they can get a sufficiency of other food, as corn, sorghum, or other clovers. As a food for bees it is excellent; and if a part of the plot or field is cut before coming into bloom, the season of bloom will be much prolonged. It is also sown along the sloping embankments and the sides of railway cuttings. The object sought is to prevent these from washing, and it has proved highly serviceable for the purpose.

Sweet clover has not been much grown for pasture, but for such a use it may yet prove to be of value. When sheep have access to a variety of grasses they will probably pass sweet clover by, even when it is young and tender. But if confined to such a pasture when it first begins to grow, they would soon begin to crop it down. To force animals thus to eat food under constraint is not good for them; but thus it is that in some instances sheep have to be confined on rape, and forced to eat it thru sheer hunger. In a short time they become very fond of the rape. So likewise they may be taught to eat sweet clover. Of course, where other and better kinds of clover will grow, it would not be wise to trouble with sweet clover. But in the semi-arid belt east of the Rocky Mountains, and in the poor sandy soils of the South, it may yet be found that an important mission awaits this plant; first, in growing a crop that will renovate the soil when plowed under, and increase its power to hold moisture; second, in furnishing food for bees; and, third, in providing pasture. Hay should be sought from it the first year rather than the second.

Sweet clover can be sown only in the spring or summer in very cold latitudes; but in those that are mild it can be sown in the autumn or spring, preferably the former. Usually not less than 15 pounds of the seed is sown to the acre. In the South it is frequently sown on the surface of stubble land after the crop has been harvested; and when thus sown it is simply covered by the harrow. If sweet clover is kept from blossoming the land will soon be freed from it when it is so desired.

We are glad to be able to present the foregoing concerning the varied values of sweet clover from so high an authority as Prof. Shaw. It will pay to show it to those who are foolishly against sweet clover.

Fool Stories About Bees and Honey.—Some time ago one of our subscribers sent us the following clipping from the Minneapolis Journal, desiring our opinion concerning it:

CORRUPTING THE BEES—TAUGHT TO SWINDLE.

ONCE HAVING MADE GLUCOSE HONEY, THEY ARE TOO LAZY TO HUNT FLOWERS.

According to information which has reacht State Dairy and Food Commissioner Bowler, the dear little busy bees, belonging to some of the bee-sharps of the country, have been made the unwitting means of perpetrating a horrible fraud upon honey-lovers. Of late years it appears that economical bee-keepers have discovered a way to keep the bees from taking their annual winter vacation. The bees are provided with warm rooms in which maple syrup and

cane-sugar are spread out over unleavened corn-bread. The innocent bees feed upon this saccharine combination and proceed to produce glucose honey, tho put up in regular combs. The deception is complete, but the honey is about as unlike the real article made from flowers as a wholly artificial imitation. Honey produced in this way is very cheap as to cost of production, when it is considered that the bees would otherwise be idle. The price of honey is also higher in the winter than at other times.

Major Bowler said yesterday that he had decided that such honey was adulterated honey. He says, however, that he will not prosecute the bees, considering them as innocent accomplices in a fraud which must be charged to their owners.

There will not be any difficulty in making prosecutions so far as the law is concerned, for it defines pure honey to be made by bees from plants.

The bees consider this manner of making honey such a snap that once they have been thoroly initiated they are of no more use for honest toil in the fields. Their extractors lose their cunning, and, remembering the luxurious affluence of winter, they refuse to buzz over the countryside and take infinite pains to get a drop of honey.

The above is a fair sample of what may be evolved out of the brain of a wild-eyed reporter who is hard up for something to fill space. And there will be plenty of people to believe that a colony of bees can be got to spend the whole winter making glucose honey out of maple and cane sugar, and that fortunes can be made thereby. What next will be started, and to what extent a strain may be put upon the gullibility of the public, it is hard to conjecture. Perhaps something like the following imaginative tale may be expected to go the rounds:

A NOVEL INDUSTRY.

THE BEES' OCCUPATION AT AN END—A NEW FORCE IN NATURE.

In the parish of Alfalita, on the boundary line between Georgia and Mississippi, just north of the lovely lake of Atchaminoka, is an exquisite little valley, so hemmed in on all sides by gently sloping hills that no hint of its existence is seen till one comes suddenly upon it. In the center of this beautiful valley rises an imposing structure, or rather a series of imposing structures, with a grand central tower. What transpires within these walls has been for generations a profound mystery.

From time to time great hogsheads have been brought in the dead of night on the little spur of railroad that shoots out from the Great Southern and Inland railroad system, and from time to time also such hogsheads have been seen loading up on the cars run alongside one of the outside walls, but well-armed guards have carefully prevented too close scrutiny of the incoming or outgoing vessels. The employees, whatever may have been their occupation, were never seen outside the walls. At intervals some negro was known to go inside, but what became of him afterwards, whether buried inside at the end of his days, or spirited to some other region, was never known.

Ambitious reporters had tried, but tried in vain, to obtain entrance. At length one of our most skillful investigators, thanks to features not altogether unlike those of an African, and to a proper application of burnt cork, made successful application for employment. How he safely escaped, if safely it could be called, and how he managed to get entire information as to all points, does not come within the scope of the chronicles. The facts, in as few words as possible, are sufficient.

The contents of the hogsheads that make their nocturnal entry are nothing more nor less than the crude sap of sugar-cane gathered from thousands of acres of growing cane. Pneumatic pumps at various points in the outer circuit of buildings send a constant stream of the raw sap toward the central building. In the very midst of this, to which none but a select few of the most trusted employees are admitted, stands a creation unlike anything to be seen elsewhere in the whole wide world. And yet it is very like what may be seen in any bee-hive, for it is simply an immense bee, apparently endowed with every attribute of life. Its wings are constantly in motion with a gentle fanning action; at intervals one after another of its six feet are lifted and set down again, and the head sways alternately from one side to another, as if investigating its surroundings. In color, form, proportion, there is really nothing to distinguish it from one of a thousand of the busy denizens of the hive, the only point of difference being its size. One of its dimensions being given, it is easy for one familiar with the form of a bee to estimate the others. From the extreme limit of its antennæ to the tip of its tail is 117 feet!

Not less remarkable, indeed much more remarkable, is the inner construction. All that is found inside a honey-bee is here found, only on a colossal scale. The various streams of the cane sap converge into one huge stream which enters the mouth of the bee, or rather enters a large aperture in its tongue, and out of another aperture nearer the base of the tongue emerges the stream after having ramified thru all the minute vessels of the great body. The difference is that what made its entrance as crude sap makes its exit as an excellent quality of the finest liquid honey. One would naturally suppose that some cunningly devised chemicals had produced the remarkable change. Nothing of the kind. The entire establishment is innocent of drugs of all kinds.

A force in Nature is at work that has elsewhere escaped observation. It is well known to scientists that a chemical change may take place in some cases because of the presence of another material, this latter material remaining itself unchanged. In the present case there seems to be a change made not in any chemical way, but by some occult power by which the *form* of the huge bee so affects the lifeless liquid that the entering sap emerges as nectar fit for the gods.

In vain may scientists say no such force is impossible; there is the crude sap, there is the verisimilitude of a gigantic bee, and there is the honey. Facts are stubborn things.

In the light of what is here divulged, it need no longer be a matter of wonder why liquid honey, or that which in trade circles is called the extract of honey, is always sold at a lower price than the genuine article made by the bees and stored in honeycombs.

And so we might go on "spinning yarns" about something that doesn't exist, similar to those ground out by the average newspaper reporter. No doubt if the foregoing piece of apiarian fiction appeared in the Chicago Record the majority of its readers would not only half believe it, but would soon tell it as a fact, and it would be a difficult matter to convince many of them that it was all a rattle-brain story.

But such are newspaper life and stories, and all bee-keepers can do is to keep on trying to spread and uphold the truth regardless of what others do or say.

Tin and Wood Packages for Honey were discust in a lively manner at the Wisconsin convention, the discussion following our paper on "Honey—From the Hive to the Table," which will appear in these columns later. The points in the discussion are well summed up by W. Z. Hutchinson, in the Country Gentleman, as follows:

"For retailing honey, selling it to grocers, the jacketed tin cans, two in a case, each can holding 60 pounds, possess decided advantages. They seldom leak, unless carelessly punctured by a nail when nailing on the jacket. If a can does leak, or meet with an accident, the loss is slight compared to what occurs when a barrel 'loses its head.' There is no loss from 'soakage,' as is sometimes the case with wooden packages. Honey in a can is easily liquefied. The greatest objection to tin cans is their cost. A barrel holding 350 pounds of honey can be bought for 80 cents. The same amount of honey put in tin cans would call for an expenditure of about $2.25 for packages. In shipping a large crop, this is a big item.

"Barrels are more easily handled, as they can be rolled, while cans must be lifted and carried, or else shoved. Manufacturers, and others using honey in large quantities, usually prefer it in barrels, as they have arrangements for handling it to advantage in such packages, and they wish to avoid the expense of tin packages. Care is needed in securing the right kind of barrels—that they are made by a man who understands his business. When it was proposed to wax the barrels, the reply was: 'Wax your cooper instead of the barrels.' However, the waxing of barrels, or rather the coating of them on the inside with paraffin, is worthy of consideration, if, as some asserted, a barrel will absorb from five to ten pounds of honey, which must be lost by the producer. A barrel can be coated on the inside with paraffin at a cost of 10 cents—much less if there is any way of heating the barrel."

CONDUCTED BY

DR. C. C. MILLER, Marengo, Ill.

(The Questions may be mailed to the Bee Journal office, or to Dr. Miller direct, when he will answer them here. Please do not ask the Doctor to send answers by mail.—EDITOR.)

Wiring Brood-Frames—Sweet Clover.

I have just bought the dovetailed hive with foundation starters one inch wide in the brood-frames, the frames being pierced ready for wire, but no wire in them.

1. Will it be necessary for me to wire these frames before putting bees in the hives?

2. What is the color of the bloom, and what is the shape of the stalk of the sweet clover?

3. Does the sweet clover grow and produce honey on the east slope of the Blue Ridge mountains? VA.

ANSWERS.—1. If you use full sheets of foundation, unless the foundation be unnecessarily heavy it will be likely to stretch and sag if you have no wires.

2. There are two kinds, one with white and the other with yellow blossoms. The stalk is round.

3. I have no positive knowledge as to that particular spot; but I doubt that there's a place in the State of Virginia where sweet clover will fail to grow and yield honey.

Wooden Sticks Instead of Wiring Foundation.

The more I manipulate frames, the more I realize the importance of having the comb come to the bottom of the frame.

1. Do you put all of the five foundation-sticks on one side of the sheet of foundation, or alternate them on both sides?

2. What detrimental results may I expect if sticks 1-12 or 1-10 inch square are used, in place of 1-16 inch, as you say yours are? MICHIGAN.

ANSWERS.—1. All on one side. Much easier done, and just as good.

2. It would probably make no great difference. The only thing would be just so much unnecessary wood, and a little more perceptible ridge over the sticks when brood was sealed. It would probably be easier to make the larger sticks if you make them by hand. Manufacturers who have slicing machines with which they slice separators can slice the sticks quite cheaply.

Prevention of Swarming.

The bee-fever again demonstrated its supremacy over environments, when in my case, June 10, 1899, I bought a strong colony of Italian bees and placed them in an attic room of a house in the middle of a busy city, with electric cars passing every 15 minutes during the day.

I placed the hive beneath a sky-light partly open. The room is plastered and that with ventilation from a small end window prevents undue heat.

This colony was ruined in moving—smothered, queen lost, and all but about a pint of bees which I carefully nurst and furnisht with a new queen.

During this time I consulted my A B C of Bee-Culture with great assiduity, and thereby saved the colony from being robbed out by another, which I bought meanwhile.

Colony No. 2, by the way, must have contracted the swarming-fever prior to my taking them, for no sooner had I gotten them home than they swarmed (June 24) in my absence. Of course, this swarming of bees in a city is very embarrassing to the owner, to say the least, not to mention the opinions of neighbors; so, since then, my main object in the study of bee-literature has been with the view to discovering some means of checking swarming, and to the getting of the most honey (increase not desired.)

I subscribed for the American Bee Journal thru whose guidance I have so far safely wintered the two colonies, altho I had to feed sugar last fall.

At present the bees are quiet and healthy in the attic room, from which light is excluded by curtains.

I should have stated before that the hives are the 8-frame Langstroth. After conning the Bee Journal diligently, I had about decided to try the Danzenbaker 10-frame hive, putting two bodies together and extract the honey; give plenty of ventilation below, with the entrances at each hive-body, and kill the old queen before time for swarming, according to the discussion on that point as given in the Bee Journal of Jan. 25. This was seemingly contradicted in the edition of Feb. 8, which says, "Probably no surer plan for causing swarming could be adopted."

If I use two hive-bodies and two entrances, do I need a separator or excluder between? and what plan better than the one contemplated would you advise for the coming season? MASSACHUSETTS.

ANSWER.—If you kill the old queen just before swarming season, you may be pretty sure of swarming, no matter how much room or ventilation, unless you kill all queen-cells but one nine days after swarming, in which case you would not be likely to have swarming. Or, listen for piping each evening after the eighth day, and when you hear piping destroy *all* cells.

Whether you use excluder between stories depends. (It may be mentioned in passing that in any case a large entrance to each story will do no little to keep down swarming.) You may allow the queen full range of the two stories, better still three stories if the colony is strong, and there will likely be no swarming. You may confine the queen to the lower story with an excluder, doing this just before the swarming season, leaving all the brood in the two upper stories and empty combs with the queen below, and you are pretty safe from swarming.

Treatment of a Laying-Worker Colony and a Colony with Drone-Laying Queen.

I think I know what you would do with a colony of bees having a laying worker, but if you had one colony with a laying worker and another with a drone-laying queen, I would like to know whether there would be any difference in your treatment of the two colonies. This is a point never toucht upon in any bee-literature that I remember reading, hence the question. IOWA.

ANSWER.—Your evident belief that there is a difference as to treatment is correct. If the colony with the drone-laying queen has been in that condition a long time and is weak, then there should be no difference; break up. A colony with laying workers is generally rather weak, if not very weak, and what bees there are have past their prime; whereas the presence of a drone-laying queen may be discovered while the colony is still strong with a fair quota of young bees. In such case, kill the drone-layer and give another queen. Such a colony, you no doubt know, will accept a queen more readily than a colony with laying workers.

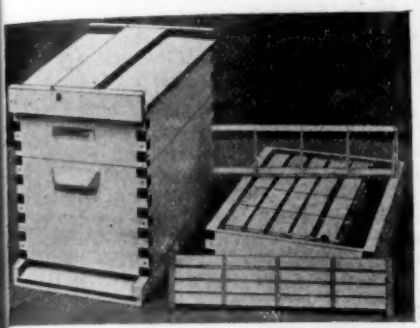
Sulphuring Mothy Brood-Frames.

How much sulphur should I burn in a house 6 feet square and the same height, to kill moths in brood-frames? What is the proper way to burn it to get the best results? NEW JERSEY.

ANSWER.—To kill worms in comb honey, when as yet they are tiny things, is quite a different matter from killing worms of full size in brood-combs. My experience has been that the latter is a very difficult matter, and I don't know how much sulphur would make it a success. I would try about two pounds as a starter, closing up everything as tight as possible, and leaving it closed for 24 hours after starting the fire. If that should not prove successful, you might try a stiffer dose. Take a dish of almost any kind, and put ashes in it. In this set another dish to contain the sulphur, and lay a hot iron or live coals on it. Unless the number of combs is considerable, it may be well to go over them by hand and pick out the biggest worms. But I wouldn't fool with sulphur in cold weather; put the combs where they'll freeze, and that will end the worms.

Root's Column

Many bee-keepers now using the 4¼x4¼ inch bee-way sections in the dovetailed hives want to try Root's plain sections and fences, but do not like to have any other size than the 4¼x4¼. For such we recommend the hive shown below:



Root's AE64P/8 Hive.

These hives are fully described in our catalog and shown in Fig. 303. We have sold more of these hives than any other style the past season.

These hives may be ordered of any of the following dealers:

The A. I. Root Co., 1024 Mississippi Street, St. Paul, Minn.
The A. I. Root Co., Mechanic Falls, Maine.
The A. I. Root Co., 10 Vine Street, Philadelphia, Pa.
The A. I. Root Co., Syracuse, N. Y.
George W. York & Co., 118 Michigan St., Chicago, Ill.
Vickery Bros., Evansville, Ill.
Walter S. Pouder, 512 Mass. Avenue, Indianapolis, Ind.
Jos. Nysewander, Des Moines, Iowa.
W. W. Cary, Lyonsville, Mass.
M. H. Hunt & Son, Bell Branch, Wayne Co., Mich.
Geo. E. Hilton, Fremont, Mich.
John Nebel & Son, High Hill, Mo.
C. H. W. Weber, 2146 Central Avenue, Cincinnati, Ohio.
A. F. McAdams, Columbus Grove, O.
Buell Lamberson, Front St. (180) Portland, Oregon.
Prothero & Arnold, Du Bois, Pa.
John H. Back, 235 W. 3rd North St., Salt Lake City, Utah, or

The A. I. Root Co.,
MEDINA, OHIO.

GENERAL ITEMS

Wintering Well—Good Prospects.

Bees are wintering well, and the prospects are good for a honey-year.

H. W. McCOMBS.

Washington Co., Iowa, March 7.

Management Important.

My bees seem to have wintered all right. I have 250 colonies; have been in the business 22 years, and have never yet had a complete failure. I believe that is doing pretty well in a locality where one has to depend entirely upon white clover, Spanish-needle and smartweed for a crop. Another disadvantage is that the land, as a rule, is all well cultivated, kept rather clean of weeds, and the wet places tiled. My experience is, however, that success depends a great deal upon management.

EMIL J. BAXTER.

Hancock Co., Ill., March 7.

Bees Gathering Pollen.

We are having fine spring weather, and bees are busy bringing pollen, but I think hardly any honey. Wintering bees is no problem here, but how to make them fill their surplus apartment is sometimes a puzzle that's hard to solve. Last year they wouldn't work in the surplus arrangement at all, and we couldn't make them, as the white clover from which we get our surplus was a total failure—something that doesn't happen every day. The first thing bees find in spring is pollen from cedar, then follow in order as named: Willow, dandelion, maple, fruit-bloom, huckleberries, blackberries, salalberries, greasewood, white clover, nightshade, fireweed, etc. I seeded a patch to sweet clover last summer, and it came out about 3 feet; this year it ought to grow much taller, but, will it have honey, is the question.

AND. OLSON.

Jefferson Co., Wash., Feb. 26.

Eucalyptus for Honey.

On page 89, Dr. J. McLean speaks of the eucalyptus tree as being very good for honey, and as they do well here I would like the names of the best varieties for honey. I also would like to know about the time of blooming.

GEO. B. MACLEOD.

Ventura Co., Calif., Feb. 20.

[We referred the foregoing to Dr. McLean, who has kindly replied as follows:—EDITOR.]

I would say that the best varieties of eucalyptus to plant in California for Mr. Macleod's purpose, are those known as Eucalyptus Globulous and Eucalyptus Amygdalina; both thrive amazingly in that State when properly planted and cared for during the first three years of their growth. The globulous has much more rapid growth, and if planted within a reasonable distance from the sea coast (the nearer the better) will grow at the rate of eight or ten feet per annum.

In order to form a nice little grove they should be planted in clumps of

say, about four, placed about three feet apart from each other in semi-circular form, each clump being about 18 feet apart. The planting must be determined by the nature of the soil; if hard and stony, holes must be dug for each plant, or for the clump, to a depth of say 18 inches; the plants carefully let down to the first leaf-shoots, and then tenderly filled around with mellow soil, leaving a basin around each about six inches deep for the first year, to receive the early rainwater. The second year gently rake in the loose soil and leaves, etc. If the soil be soft and free for the plow, a subsoil plow may be run the full length of intended grove or fringe, making two close furrows, into which plant and fill around with mellow soil as in the dug holes.

Much hardier plants than the two named must be used in and around Chicago, which I will be pleased to name for the guidance of any *bona-fide* enquirer. DR. J. MCLEAN.

LATER.—It has just occurred to me that I omitted to state in my letter in reply to Mr. Macleod, regarding the time that the eucalyptus named by me blooms. They commence to bloom about the middle of February, and continue for about three months. Sunflowers may be planted between the clumps in a grove, for the bees to work on at any time, said flowers therein planted become changed to somewhat resemble the eucalypti odor and medicinal quality. J. M.

Bees Getting Along Nicely.

My bees are getting along nicely in the cellar, by what I can read. I bought two fine colonies last spring, and put five in the cellar. Last year was not a very good one for the bee-keeper, but this year may be pretty good. There is nothing like keeping up one's courage. You know an Irishman always "tries again."

WESLEY HUNTER.

Ontario, Canada, March 5.

Fine Rain, but Too Late.

We have just had a fine rain amounting to an inch, which will materially help growing grain, but the bee-interests seem to be almost beyond help so far as getting much profit out of the business this year. The warm, dry weather of January and February brought the sage forward prematurely, and I think destroyed the hope of getting much nectar from those splendid honey-producing plants. With our average amount of rainfall this month, and some in April, most bees will probably pull thru in fair condition, but as for there being much honey to spare from this part of the State this year, I for one do not believe it.

ALBERT ROZELL.

Los Angeles Co., Calif., March 6.

No. 3.—Medical Animals.

Dick's dead. Yes, gone to Roosterland! His large family cackeled his praises, sung of his prowess and brave deeds on various barnyard battle-fields; of how he overcame the Shanghigh Philistine, and of his many other virtues; but for all that he was mortal, and made room for a younger and red-

der chanticleer. He rests in piece-es.

You would naturally suppose that donkey's could have nothing to trouble them but brutal men and thoughtless boys, but they really get sick every now and then, generally as the result of bad treatment and starvation; and finally die like other living beasties. Their greatest trouble is an inflammation of the stomach, which bloats and swells until death comes to their relief. But whenever they can find a patch of big bull-thistles there is their panacea. They'll eat and eat of its prickly leaves, and lie down in the hot sun, and shortly they are well.

But what a miserable life is theirs! A 250-pound brute straddles the poor little burro, armed with a big club to beat it, and expects to climb the side of a steep hill with him! As well expect a child to carry a big sack of corn! Such inhumanity has made my blood boil more than once, and I have often wisht that patient Jennie would spill its burly tormentor down the precipice, irrespective of consequences.

The patient ox, too, is not proof against sickness. Men have trouble enough with one stomach, but old Jerry has three of them—no wonder he feels out of sorts at times. But he knows just how to cure himself if turned loose to find his medicine. He waddles along with his nose nearly to the ground, hollow-eyed and heated horns, now and then so weak he braces his legs so he can stand up. He makes a bee-line for the clump of poke-berries yonder in the pasture-lot—he's had it in mind a long time, and he is no

sooner up to them than he begins to munch on its leaves; then lies down to rest. After awhile he tries it again, and the first thing you know he's all right, and ready for all the tender grass he can get.

But of all the "cute" animals familiar to us is the festive mule. He knows a great deal more than the drivers who generally have supervision over him. When treated kindly Mr. Mule is very tractable and industrious, but if abused he tries to "even up" scores by a vigorous kick when the chance offers. I admire his pluck!

From one cause or another he, too, gets shy on his feed, hangs his head down, with ears nearly to the ground, just able to wabble to the sunny side of the barn. Poor Mule looks very disconsolate—not even a handful of oats will prove an allurement. But he smells his medicine from afar! Open the gate and you'll see him make a straight shoot for a bunch of jimsonweed growing in such luxuriance just below the pig-pen, down there. What a breath that mule must have after his feast! But it won't be three days before he will be kicking up his heels like a trained "foot-baller."

Because of bad harness, muley often has a sore back which he proceeds to cure as follows: He hunts up the thickest patch of smartweed in the slough—near the creek, you know—and he'll roll and roll over those weeds until he has rubbed on plenty of its juice, and the mud that also sticks to him acts as a piece of court-plaster to protect the sore while it is healing. Isn't that good mule-sense?

The most pathetic, because the meanest, use that mules and horses are finally put to, in some European countries—France and Austria in particular—is being driven into leech-lakes, where the leeches may thrive and fatten for market on the poor old horses and mules that have so long

and faithfully served their heartless masters. It is a pitiful sight to see the poor beasts literally covered with the leeches that are sucking the last remaining drops of blood, finally to drop exhausted, food for wolves and ravens.

UNCLE FRANK.

Bees Didn't Do Well.

Bees have not done well here the last two years. Last year was too dry for white clover, also for fall bloom, which found the bees short of stores for winter. I have 70 colonies on the summer stands apparently in good shape. They will probably require a little feeding later on.

G. C. ALLINGER.

Marion Co., Ohio, March 5.

Convention Notices.

Chicago.—The Chicago Bee-Keepers' Association will hold its regular semi-annual meeting in Wellington Hall, 70 N. Clark St., Chicago, Ill., April 6, 1900, afternoon and evening. The meeting will be called to order at 1 p.m. Dr. C. C. Miller is expected to be present if his health will permit. Mr. E. R. Root has been invited, also Mr. N. E. France, and others. A good time may be expected by all. Let every one come, especially the ladies.

Park Ridge, Ill. HERMAN F. MOORE, Sec.

Utah.—The Utah State Bee-Keepers' Association will hold its semi-annual convention in the City and County Building, Salt Lake City, Apr. 6, 1900, at 10 o'clock a.m. A full program in the interest of the industry will be presented, and all our bee-keepers can help themselves by aiding the Association, and in order to create a closer bond of union among our bee-keepers. As a further incentive to the success of the bee-industry, it is very desirable to have our bee-keepers from all parts attend the spring convention.

J. B. FAGG, Sec.

HONEY AND BEESWAX

MARKET QUOTATIONS.

CHICAGO, March 8.—There is a small trade in choice to fancy white comb honey at 15c per pound, but aside from this there is little doing in any other grade, with an uncertain range of prices, for those who have it want to sell and buyers can get reductions from prices askt. Off grades of white, 10@13c; ambers, 8@10c; dark, 7@9c. White extracted weak at 8c; ambers, 7@7½c; dark, 6½@7c. Beeswax steady at 28c.

R. A. BURNETT & Co.

CINCINNATI, March 3.—There is some demand for extracted honey from manufacturers at 7@7½c for amber and Southern; clover, 8@8½c. Comb honey is selling firm at 14@16½c in a small way. Beeswax, 25@27c.

C. H. W. WEBER,
Successor to Chas. F. Muth & Son and A. Muth.

LOS ANGELES, March 1.—1-pound frames, 12½@15c; 2-pound cans, 2 dozen in case, per dozen, $2.50; 2-pound glass pails, per dozen, $2.50. Extracted, water white, 60-pound tins, per pound, 8½c; light amber, 7½@8c; dark amber, 7½c. Beeswax, 25@26c.

The prospect for a crop is very bad. Small lots in the hands of wholesale houses are firmly held.

BOSTON, March 9.—Our honey market is showing some signs of lower prices, altho the stock on hand is not large. At the same time prices are so much higher than previous years that the trade have taken it very slowly and the results are that the holders are willing to range prices quite a little in order to move stock on hand. Prices range: Fancy white, 17@18c; No. 1, 15@16c; amber, 10@12c; buckwheat almost unsalable. Extracted, best white California, 8½c.

BLAKE, SCOTT & LEE.

KANSAS CITY, Mar. 10.—We quote fancy white comb, 15c; No. 1, 14c; No. 1 amber, 13½c; No. 2 amber, 13c. Extracted, white, 8c; amber, 7c; dark, 6c. Beeswax, 22@25c.

The supply of comb is very light, demand good; supply of extracted light, especially white, demand fair. C. C. CLEMONS & Co.

BUFFALO, March 3.—Market nearly bare of all grades of honey. Probably no more from any source to market, but if so, fancy white comb is firm at 15@16c. Other grades from 14c downward, with the poorest at 8@9c. Fancy pure beeswax continues at 28@30c.

BATTERSON & Co.

NEW YORK, Feb. 8.—During the past 30 days our market has been somewhat slow and easy in both comb and extracted honey. Stocks of comb honey, however, are almost exhausted, and there is a fair demand for all grades. Fancy white selling at 15c; No. 1 white at 13@14c; fancy amber, 11@12c, and buckwheat at 9@11c, according to quality, etc.

Our market is well supplied with extracted, tho prices are firm and unchanged. Beeswax sells very well at from 26@28c, according to quality. HILDRETH & SEGELKEN.

SAN FRANCISCO, Feb. 28.—White comb, 11½@12½c; amber, 8@10c. Extracted, white, 7½@8c. light amber, 7@7½c; amber, 5@5½c; Beeswax, 26@27c.

Supplies and demand are both at present limited, which is to be expected at the close of a light crop year. Business doing is mostly of a small jobbing character, and at practically the same figures as have been current for some time past.

OMAHA, Feb. 13.—Demand shows some improvement in January, having been much more active, but as anticipated there is no advance in prices. Market remains steady at 14@14½c for fancy white comb and 8½c for white extracted. The latter is pretty well cleaned up along the Missouri River, and it looks as if there would be some shortage before another crop comes in. From present appearances there is about enough comb honey to go around at the present prices, hence we look for no particular change in values. PEYCKE BROS.